IN THE CLAIMS

I claim:

1-20, 52, 78, 79, 91, and 92 (canceled)

21. (withdrawn)

An apparatus for determining an anticipated fully charged or nearly discharged battery, comprising:

a battery source for powering a battery-powered device;

an apparatus for performing program instructions, comprising:

a processor capable of performing control functions;

a processor-controlled analog-to-digital converter interconnected to said battery via an interface comprised of at least one of one or more input/output ports accessible to a plurality of conductors and contacts of a connector assembly, said interface being so configured as to provide a means of controllably electrically coupling at least one of one or more resistive elements as a temporary electrical preloading of said battery for outputting to said analog-to-digital converter at least one minimum battery voltage, instead of a previous outputting of at least one maximum battery voltage;

a memory accessible to said processor for storing voltage values acquired by said analog-to-digital converter;

a computer-readable medium including a look-up table, also stored in said memory, comprising a substantial matrix of battery design parameters expressed as voltage values of a multiplicity of batteries arranged by both chemistry type and typical cells-per-pack configurations;

said computer-readable medium including program instructions for configuring said processor to perform a first comparing of the acquired

maximum voltage value to each maximum design voltage value from said look-up table, and further

including program instructions for configuring said processor to perform a second comparing of the acquired minimum voltage value to each minimum design voltage value from said look-up table,

whereby said first comparing results in said acquired maximum voltage value being excessively elevated as compared to said maximum design voltage values from said look-up table, thereby determining said anticipated fully-charged battery, and

whereby said second comparing results in said acquired minimum voltage value being excessively depressed when as compared to said minimum design voltage values from said look-up table, thereby determining said anticipated nearly-discharged battery.

22. (withdrawn)
The determining of an anticipated fully charged or nearly discharged battery of claim 21, wherein said determining is performed prior to the execution of further program instructions for configuring said processor to output a first voltage value to a configurable power supply.

23. (withdrawn)
The look-up table of claim 21, wherein all indicated values are recalibrated to compensate for an additional load of a diode electrically coupled to conductors of a receptacle of said connector assembly, said receptacle interface being located along the housing of said battery.

24. (withdrawn)
The connector assembly of claim 21, further including a selectively user-positionable connector plug which, in a first position, transfers electrical signals between said apparatus and said battery, instead of being in a second position for transferring signals between said apparatus and said battery-powered device.

25. (withdrawn)

The selectively user-positionable connector plug of claim 24, further including program instructions for configuring a processor to generate at least one of one or more visual indicia to a user, thereby prompting said user to manipulate said connector plug so that its contacts now transfer signals between said apparatus and said battery powered device.

26. (withdrawn)

The transfer of electrical signals between said apparatus and said battery-powered device of claim 24, further including in said apparatus and battery-powered device a means of inter-device communications for transferring signals.

27. (withdrawn)

The means of inter-device communications of claim 26, further including additional program instructions for configuring processors of said apparatus and of said battery-powered device respectively to transfer data signals by at least one communications medium selected from the group consisting of powerline modulation, and wireless infrared, and serial/parallel data protocols.

28. (withdrawn)

The acquired minimum and maximum battery voltage values of claim 21, wherein said values are retained in memory for use in further program instructions to configure said processor for calculating a voltage that represents at least a first output value of a processor-configurable variable-output power supply.

29. (withdrawn)

The computer-readable medium of the apparatus of claim 21, wherein said program instructions and requisite hardware to execute the instructions are embedded into aircraft systems.

30. (withdrawn)

The computer-readable medium of the apparatus of claim 21, wherein said program instructions and related hardware of said apparatus are incorporated into a discrete modular apparatus for interconnecting in-line between an external power-conversion adapter and said battery of said powered device.

31. (withdrawn)

The apparatus of claim 21, wherein said apparatus is embedded, and said program instructions are written to operate in an embedded environment.

32. (withdrawn)

The computer-readable medium of claim 21, wherein said program instructions configure said processor to acquire said maximum battery voltage value prior to acquiring said minimum battery voltage value, in order to take advantage of a known recovery capability of said battery.

33. (withdrawn)

The computer-readable medium of claim 21, wherein said program instructions configure said processor to control a switch located in said circuit between said analog-to-digital converter and said battery, for selectively electrically coupling into the circuit at least one of one or more resistive elements.

34. (withdrawn)

An apparatus for determining the chemistry-type of a battery, comprising:

> a general-purpose processor capable of accessing an analog-to-digital converter for acquiring voltage values of said battery;
>
> a means of interconnecting said battery to said A/D converter including a receptacle at said battery for mating to a user-positionable connector plug;
>
> a memory to which said processor writes:
>
>> an acquired first value expressing a maximum output-voltage of said battery in a no-load condition;

a second value being retrieved from a look-up table comprising a substantial matrix of predetermined battery design parameters expressed as both maximum- and minimum-voltage reference values for a multiplicity of battery cells-per-pack configurations arranged by chemistry types;

a computer-readable medium embodying program instructions for configuring said processor for performing a comparing of the acquired first value to the retrieved second value as a maximum-voltage reference value, and

said processor analyzes the results of said comparing by determining whether said acquired first value is within a predetermined tolerance range of voltage variance when compared to the retrieved maximum-voltage reference value, thereby said analyzing resulting in either:

accepting said comparing as confirming that both voltage values are substantially the same, whereupon said processor writes both values to memory, or

rejecting said comparing because said acquired first value falls outside said predetermined tolerance range of voltage variance when compared to said retrieved maximum-voltage reference value, whereupon said processor discards the rejected maximum-voltage reference value and then retrieves from among the previously unselected maximum-voltage values in said look-up table another reference value for repeating said comparing and analyzing functions;

said retrieving, comparing and analyzing functions repeat until said analyzing results in an accepting of both the acquired first and retrieved maximum-voltage reference values, and said processor writes both values to memory;

a means of electrically engaging at least one of one or more resistive elements as a predetermined electrical pre-load temporarily applied to said battery for said analog-to-digital converter acquiring from said battery a third

value expressed as a minimum output-voltage, said processor then writing said acquired third value to memory;

further program instructions for configuring said processor for retrieving from said look-up table a fourth value expressing a predetermined minimum design voltage of a battery of the same cells-per-pack configuration and chemistry type as that of the previously accepted maximum-voltage reference value, said processor then writing the retrieved value to memory as a minimum-voltage reference value;

additional program instructions for configuring said processor for performing a comparing of the acquired third value to the retrieved minimum-voltage reference value;

further program instructions for configuring said processor for analyzing the results of said comparing by determining whether said acquired third value is within a predetermined tolerance range of voltage variance when compared to said retrieved minimum-voltage reference value, thereby said analyzing resulting in either:

> accepting said comparing as confirming that both values are substantially the same, whereupon said processor writes both values to memory, or
>
> rejecting said comparing because said acquired third value falls outside said predetermined tolerance range of voltage variance when compared to said retrieved minimum-voltage reference value, whereupon said processor retrieves from among the previously unselected minimum-voltage reference values in said look-up table another reference value for repeating said comparing and analyzing functions;

said retrieving, comparing and analyzing operations repeat until said analyzing results in an accepting of both the acquired third and retrieved

maximum-voltage reference values, and said processor writes both values to memory;

configuring said processor by further program instructions for executing a LIST function comprised of a compiling of the four previously accepted voltage values stored in memory, and

configuring said processor by additional program instructions for performing a SORT function upon the listed values by arranging the four previously accepted voltage values in ascending order,

whereby resulting in only a correctly determined battery chemistry type from among those in said look-up table yielding sorted values listed in a specific sequential order consisting of:

first, the retrieved minimum-voltage reference value;

second, the acquired minimum battery voltage value;

third, the acquired maximum battery voltage value, and

fourth, the maximum-voltage reference value.

35. (withdrawn)

The means of interconnecting said battery to said A/D converter of claim 34, further including a diode strapped across contacts of said receptacle, resulting in said apparatus having access to both said battery and said powered-device, whereby the need for the connector plug to be user-positionable is eliminated.

36. (withdrawn)

The look-up table of claim 34, further including a charge rate for each battery chemistry type as a variable in a processor calculation to determine an impedance value of said resistive element.

37. (withdrawn)

The sorting of a list of voltage values of claim 34, wherein an acquired maximum-voltage value that varies significantly from said predetermined battery design

parameter because said battery being fully charged causes it to output an excessively elevated maximum voltage, said acquired maximum-voltage value is adjusted by the predetermined tolerance range of voltage variance being calculated into said maximum-voltage value prior to said sorting.

38. (withdrawn)

The sorting of a list of voltage values of claim 34, wherein an acquired minimum-voltage value that varies significantly from said predetermined battery design parameter because said battery being nearly discharged causes it to output an excessively low minimum voltage, said acquired minimum-voltage value is adjusted by the predetermined tolerance range of voltage variance being calculated into said minimum-voltage value prior to said sorting.

39. (withdrawn)

An apparatus for employing electrical load values in determining various machine states of a user-interactive apparatus for delivering power to a battery-powered device, comprising:

a power-delivery apparatus comprising:

a general-purpose processor accessible to a memory and an analog-to-digital converter, said converter for acquiring electrical load and voltage values along a circuit which is configurable by an anticipated user-interactive attaching of a plurality of device-interconnecting elements consisting of a power cord, a positionable connector plug for attaching thereto, and a removable connector plug cover, each user-attachable element being itemized in a look-up table that further also lists a corresponding predetermined electrical load value thereof;

said user-attachable elements being sequentially engageable to close said circuit, thereby electrically coupling said apparatus selectively to either a battery or said battery-powered device;

a power supply capable of a multiplicity of output voltages, being configurable by said processor executing program instructions embodied on a computer-readable medium;

said program instructions resulting in at least the following principlé machine states of said apparatus:

a first machine state, wherein said processor shuts down said power supply prior to said analog-to-digital converter polling said circuit for the presence of a voltage signal for determining if said battery has erroneously been prematurely electrically coupled to said apparatus;

a second machine state, wherein said processor configures said power supply to output a low-voltage signal along said circuit for enabling said analog-to-digital converter to acquire electrical current values;

a third machine state, whereupon said processor compares each acquired current value to the predetermined load values in said look-up table, as a process for monitoring said user sequentially attaching each of said device-interconnecting elements, the attaching sequence also being defined in said look-up table as a series of changes in machine states, comprising:

a fourth machine state, being a user attaching one terminus of said power cord to a port of said apparatus, said power cord designed to conform to a predetermined load value that corresponds to this particular configuration of said apparatus as defined in said look-up table;

a fifth machine state, as said user attaching said connector plug to the other terminus of said power cord, said connector plug designed to conform to a predetermined load value that

corresponds to this particular configuration of said apparatus as defined in said look-up table;

a sixth machine state, being said user removing said connector plug cover, said cover incorporating a resistive element that conforms to a predetermined load value that corresponds to this particular configuration of said apparatus as defined in said look-up table, and

whereupon, during each user-attaching of the inter-connecting elements in the preceding fourth, fifth, and sixth machine states, additional machine states occur, in which program instructions configure said processor, power supply, and analog-to-digital converter for acquiring a load value from along the circuit, the acquired load value then being compared to a predetermined load value representing the impedance of each of said device-interconnecting elements listed in said look-up table, thus confirming that said user is properly performing said attaching sequence;

a seventh machine state, as said user inserting said connector plug, in its first of two available positions, into a mating receptacle at said battery, thereby closing the previously open circuit between said apparatus and said battery;

an eighth machine state, in which program instructions configure said processor and analog-to-digital converter for polling along the now-closed circuit for the presence of a line voltage, whereby detecting voltage confirms that said user has inserted said connector plug in its first selectable position, resulting in said apparatus being electrically coupled to said battery, instead of said user mistakenly selecting a second connector plug position, which would erroneously result in coupling said apparatus to said powered device;

a ninth machine state, wherein said processor acquires a battery voltage;

a tenth machine state, wherein the acquired battery voltage provides said processor with a value for replacing a maximum-voltage variable in said look-up table, the maximum-battery-voltage value being stored in memory;

an eleventh machine state, wherein a means of temporarily introducing a predetermined load into the circuit for providing said processor with a voltage value acquired from said battery for replacing a minimum-voltage variable in said look-up table, the resulting minimum-battery-voltage value being stored in memory;

a means of prompting said user to again manipulate said connector plug to its second position, thereby reconfiguring said circuit, as a twelfth machine state;

a thirteenth machine state, wherein said analog-to-digital converter polls said circuit for a voltage signal, the absence of said voltage signal confirming that said user has successfully manipulated said connector plug to its second position;

a fourteenth machine state, wherein said processor configures said power supply to output a low-voltage signal, thereupon enabling said analog-to-digital converter to acquire a current value along said circuit;

a fifteenth machine state, wherein said processor analyzes the acquired current value as representing a total cumulative load attributable to a combination of said resistive elements introduced in the previous fourth through sixth machine states, plus an additional load value attributable to an anticipated electrical load generated by the internal circuitry of the now- connected battery-powered device, the presence of said additional load being an indicator confirming that

said battery, while still mechanically attached along the reconfigured circuit, is electrically bypassed and, instead, said powered device is now electrically coupled to said apparatus, and

a sixteenth machine state being a determining-means for said processor to configure an initial output voltage of said power supply,

whereby, as a seventeenth machine state, said power supply delivers the previously determined initial output voltage to said powered device.

40. (withdrawn)
The connector plug of claim 39, further including a device for controlling the direction of electrical flow being incorporated into said mating receptacle at said battery, whereby said apparatus is accessible to both said battery and powered device, instead of to only either said battery or said powered device and, whereby indicia and program instructions for prompting a user to reposition said connector plug are eliminated and, further whereby a user can enjoy the convenience of simply plugging in without further distractions or interactions.

41. (withdrawn)
The device for controlling the direction of electrical flow of claim 40, further including a bleed resistor in parallel to said device for controlling the direction of electrical flow, for an analog-to-digital converter acquiring non-suppressed battery voltage values, whereby a recalibration of all pre-determined minimum voltage values in a look-up table is eliminated.

42. (withdrawn)
The look-up table of claim 39, further including anticipated machine states arranged in a matrix of fixed and variable resistive values that correspond to specific identified hardware elements of said apparatus in combinations and assemblages thereof, so that program instructions that require said processor to access said look-up table identifies not only said anticipated machine states, but also determine existing and anticipated combinations of said hardware elements, as well as determining a present position of a user-positionable connector plug, by simply acquiring a load

value at any time during the execution of said program instructions, said processor then comparing said acquired value to those listed in said look-up table, thereby facilitating the proper execution of said program instructions, as well as minimizing error conditions.

43. (withdrawn)

The hardware elements in the look-up table of claim 42, wherein said hardware elements are manipulated at the time of design or manufacture to consistently exhibit the pre-determined specific fixed resistive values identified in said look-up table.

44. (withdrawn)

The look-up table of claim 42, wherein program instructions for a processor use at least one acquired load value, in conjunction with other load and voltage values that are acquired, as well as those values listed in said look-up table, to perform calculations and analyses for determining whether a powered device is in either its OFF or ON state.

45. (withdrawn)

The look-up table of claim 39, further including line-load values that distinguishably differentiate two machine states:

one being a state in which said battery that is electrically coupled to said apparatus is mechanically detached from the battery's associated battery-powered device, while

the other state being that in which said battery is mechanically attached to said battery-powered device.

46. (withdrawn)

The program instructions of claim 39, further including a sub-set of said program instructions for configuring said processor for executing a sub-routine that continuously loops a sequence comprising:

first, said processor configuring said analog-to-digital converter to acquire a line-voltage value from along said circuit, then

second, said processor then reconfiguring the converter and said power supply to acquire a line-load value from along said circuit, and

a timing rate for repeating said sub-routine being adjusted by said program instructions to said processor, based on an identified machine state.

47. (withdrawn)
The timing rate of claim 46, wherein said identified machine state includes a period of time after said processor has issued a prompt to a user, during which said processor waits for said user is to perform an anticipated action, the amount of wait-time being factored into program instructions of a processor-function for adjusting said timing rate.

48. (withdrawn)
The adjusting of the timing rate of claim 47, further including extending said wait-time, because said processor has no available means of issuing prompts to said user.

49. (withdrawn)
The anticipated electrical load generated by the internal circuitry of a connected battery-powered device of claim 39, wherein said anticipated load is substantially comprised of an aggregate impedance value attributable to all internal circuitry and elements thereof that collectively constitute all or part of a conductive path that terminates at said device's ON/OFF switch when said device is in an OFF state, said conductive path being accessible to said apparatus when attached to electrical contacts for interfacing to a battery of said battery-powered device.

50. (withdrawn)

The computer-readable medium of the apparatus of claim 39, wherein said program instructions and related hardware of said apparatus are incorporated into a battery pack.

51. (withdrawn)

The apparatus of claim 39, wherein said apparatus is embedded, and said program instructions are written to operate in an embedded environment.

53. (withdrawn)

A method of determining an anticipated fully charged or nearly discharged battery, comprising:

providing a battery source for powering a battery-powered device;

providing an apparatus for performing program instructions, comprising:

providing a processor capable of performing control functions;

providing a processor-controlled analog-to-digital converter interconnected to said battery via an interface comprised of at least one of one or more input/output ports accessible to a plurality of conductors and contacts of a connector assembly, said interface being so configured as to provide a means of controllably electrically coupling at least one of one or more resistive elements as a temporary electrical preloading of said battery for outputting to said analog-to-digital converter at least one minimum battery voltage, instead of a previous outputting of at least one maximum battery voltage;

providing a memory accessible to said processor for storing voltage values acquired by said analog-to-digital converter;

providing a computer-readable medium including a look-up table, also stored in said memory, comprising a substantial matrix of battery design parameters expressed as voltage values of a multiplicity of batteries arranged by both chemistry type and typical cells-per-pack configurations;

said computer-readable medium including program instructions for configuring said processor to perform a first comparing of the acquired maximum voltage value to each maximum design voltage value from said look-up table, and further

including program instructions for configuring said processor to perform a second comparing of the acquired minimum voltage value to each minimum design voltage value from said look-up table,

whereby said first comparing results in said acquired maximum voltage value being excessively elevated as compared to said maximum design voltage values from said look-up table, thereby determining said anticipated fully-charged battery, and

whereby said second comparing results in said acquired minimum voltage value being excessively depressed when as compared to said minimum design voltage values from said look-up table, thereby determining said anticipated nearly-discharged battery.

54. (withdrawn)
The method of claim 53, wherein excessively elevated or excessively depressed voltage values are compensated for by additional program instructions for configuring said processor for adjusting the excessive voltage values downward or upward respectively by a predetermined voltage tolerance amount, resulting in adjusted maximum- or minimum-voltage values that are available for other program instructions.

55. (withdrawn)
The temporary electrical preloading of claim 53, wherein at least one of said one or more resistive elements is a power resistor having an impedance value substantial enough to simulate an operational load of said battery-powered device.

56. (withdrawn)

The temporary electrical preloading of claim 53, wherein the resistive value of at least one of said one or more resistive elements is determined by the charge rate of a battery based on its chemistry-type, as expressed in a look-up table that lists batteries by chemistry types and charge rates.

57. (withdrawn)

The determining of a nearly-depleted battery of claim 53, wherein said excessively-depressed minimum voltage value can indicate a potentially unsafe battery.

58. (withdrawn)

The determining of a nearly-depleted battery of claim 57, wherein said determining further includes a notification of the battery condition to a user.

59. (withdrawn)

The notification of claim 38, wherein at least one means of notifying said user includes program instructions for configuring a processor to control a means of visually prompting said user as part of the apparatus.

60. (withdrawn)

The acquired maximum and minimum battery voltage values of claim 53, wherein said values are stored in memory to be accessed by further program instructions for configuring said processor for determining the power requirements of said powered device adapted to receive power selectably from said battery and said configurable power supply.

61. (withdrawn)

The computer-readable medium of the apparatus of claim 53, wherein said program instructions and related hardware of said apparatus are incorporated into an external power-conversion adapter for interconnecting a source of power to said battery of said powered device.

62. (withdrawn)

The computer-readable medium of the apparatus of claim 53, wherein said program instructions and related hardware of said apparatus are incorporated into a battery pack.

63. (withdrawn)

A method of determining the chemistry-type of a battery, comprising:

providing a general-purpose processor capable of accessing an analog-to-digital converter for acquiring voltage values of said battery;

providing a means of interconnecting said battery to said A/D converter including a receptacle at said battery for mating to a user-positionable connector plug;

providing a memory to which said processor writes:

an acquired first value expressing a maximum output-voltage of said battery in a no-load condition;

a second value being retrieved from a look-up table comprising a substantial matrix of predetermined battery design parameters expressed as both maximum- and minimum-voltage reference values for a multiplicity of battery cells-per-pack configurations arranged by chemistry types;

providing a computer-readable medium embodying program instructions for configuring said processor for performing a comparing of the acquired first value to the retrieved second value as a maximum-voltage reference value, and

said processor analyzes the results of said comparing by determining whether said acquired first value is within a predetermined tolerance range of voltage variance when compared to the retrieved maximum-voltage reference value, thereby said analyzing resulting in either:

accepting said comparing as confirming that both voltage values are substantially the same, whereupon said processor writes both values to memory, or

rejecting said comparing because said acquired first value falls outside said predetermined tolerance range of voltage variance when compared to said retrieved maximum-voltage reference value, whereupon said processor discards the rejected maximum-voltage reference value and then retrieves from among the previously unselected maximum-voltage values in said look-up table another reference value for repeating said comparing and analyzing functions;

said retrieving, comparing and analyzing functions repeat until said analyzing results in an accepting of both the acquired first and retrieved maximum-voltage reference values, and said processor writes both values to memory;

providing a means of electrically engaging at least one of one or more resistive elements as a predetermined electrical pre-load temporarily applied to said battery for said analog-to-digital converter acquiring from said battery a third value expressed as a minimum output-voltage, said processor then writing said acquired third value to memory;

providing further program instructions for configuring said processor for retrieving from said look-up table a fourth value expressing a predetermined minimum design voltage of a battery of the same cells-per-pack configuration and chemistry type as that of the previously accepted maximum-voltage reference value, said processor then writing the retrieved value to memory as a minimum-voltage reference value;

providing additional program instructions for configuring said processor for performing a comparing of the acquired third value to the retrieved minimum-voltage reference value;

providing further program instructions for configuring said processor for analyzing the results of said comparing by determining whether said acquired third value is within a predetermined tolerance range of voltage variance when compared to said retrieved minimum-voltage reference value, thereby said analyzing resulting in either:

accepting said comparing as confirming that both values are substantially the same, whereupon said processor writes both values to memory, or

rejecting said comparing because said acquired third value falls outside said predetermined tolerance range of voltage variance when compared to said retrieved minimum-voltage reference value, whereupon said processor retrieves from among the previously unselected minimum-voltage reference values in said look-up table another reference value for repeating said comparing and analyzing functions;

said retrieving, comparing and analyzing operations repeat until said analyzing results in an accepting of both the acquired third and retrieved maximum-voltage reference values, and said processor writes both values to memory;

configuring said processor by further program instructions for executing a LIST function comprised of a compiling of the four previously accepted voltage values stored in memory, and

configuring said processor by additional program instructions for performing a SORT function upon the listed values by arranging the four previously accepted voltage values in ascending order,

whereby resulting in only a correctly determined battery chemistry type from among those in said look-up table yielding sorted values listed in a specific sequential order consisting of:

first, the retrieved minimum-voltage reference value;

second, the acquired minimum battery voltage value;

third, the acquired maximum battery voltage value, and

fourth, the maximum-voltage reference value.

64. (withdrawn)

The receptacle for mating to a user-positionable connector plug of claim 63, wherein the connector plug includes a fist position for enabling access of said apparatus to said battery, and a second position for enabling access of said apparatus to said powered device.

65. (withdrawn)

The look-up table of claim 63, wherein wherein all indicated resistive values are recalibrated to compensate for an additional load of a diode that controls the direction of electrical flow of said battery's power output signals, said diode being electrically coupled to conductors of a receptacle of said connector assembly, said receptacle's accessible interface being located along the housing of said battery.

66. (withdrawn)

The matrix of predetermined battery design parameters of claim 63, wherein said predetermined design parameters substantially represent industry standard values for charge rates, minimum and maximum voltages of individual battery cells, as well as typical battery pack configurations for at least one identifiable category of battery-powered devices.

67. (withdrawn)

The category of battery-powered devices of claim 66, wherein said category is derived from analyzing battery voltages and the typical number of cells normally required to power a particular group of substantially similar devices.

68. (withdrawn)

The predetermined tolerance range of voltage variance of claim 63, wherein said tolerance range allows for voltage variances caused by either fully-charged or nearly discharged batteries.

69. (withdrawn)

A method of employing electrical load values in determining various machine states of a user-interactive apparatus for delivering power to a battery-powered device, comprising:

providing a power-delivery apparatus comprising:

providing a general-purpose processor accessible to a memory and an analog-to-digital converter, said converter for acquiring electrical load and voltage values along a circuit which is configurable by an anticipated user-interactive attaching of a plurality of device-interconnecting elements consisting of a power cord, a positionable connector plug for attaching thereto, and a removable connector plug cover, each user-attachable element being itemized in a look-up table that further also lists a corresponding predetermined electrical load value thereof;

said user-attachable elements being sequentially engageable to close said circuit, thereby electrically coupling said apparatus selectively to either a battery or said battery-powered device;

providing a power supply capable of a multiplicity of output voltages, being configurable by said processor executing program instructions embodied on a computer-readable medium;

said program instructions resulting in at least the following principle machine states of said apparatus:

providing a first machine state, wherein said processor shuts down said power supply prior to said analog-to-digital converter polling said circuit for the presence of a voltage signal for determining if said

battery has erroneously been prematurely electrically coupled to said apparatus;

providing a second machine state, wherein said processor configures said power supply to output a low-voltage signal along said circuit for enabling said analog-to-digital converter to acquire electrical current values;

providing a third machine state, whereupon said processor compares each acquired current value to the predetermined load values in said look-up table, as a process for monitoring said user sequentially attaching each of said device-interconnecting elements, the attaching sequence also being defined in said look-up table as a series of changes in machine states, comprising:

> providing a fourth machine state, being a user attaching one terminus of said power cord to a port of said apparatus, said power cord designed to conform to a predetermined load value that corresponds to this particular configuration of said apparatus as defined in said look-up table;
>
> providing a fifth machine state, as said user attaching said connector plug to the other terminus of said power cord, said connector plug designed to conform to a predetermined load value that corresponds to this particular configuration of said apparatus as defined in said look-up table;
>
> providing a sixth machine state, being said user removing said connector plug cover, said cover incorporating a resistive element that conforms to a predetermined load value that corresponds to this particular configuration of said apparatus as defined in said look-up table, and

whereupon, during each user-attaching of the inter-connecting elements in the preceding fourth, fifth, and sixth machine states, additional machine states occur, in which program instructions configure said processor, power supply, and analog-to-digital converter for acquiring a load value from along the circuit, the acquired load value then being compared to a predetermined load value representing the impedance of each of said device-interconnecting elements listed in said look-up table, thus confirming that said user is properly performing said attaching sequence;

providing a seventh machine state, as said user inserting said connector plug, in its first of two available positions, into a mating receptacle at said battery, thereby closing the previously open circuit between said apparatus and said battery;

providing an eighth machine state, in which program instructions configure said processor and analog-to-digital converter for polling along the now-closed circuit for the presence of a line voltage, whereby detecting voltage confirms that said user has inserted said connector plug in its first selectable position, resulting in said apparatus being electrically coupled to said battery, instead of said user mistakenly selecting a second connector plug position, which would erroneously result in coupling said apparatus to said powered device;

providing a ninth machine state, wherein said processor acquires a battery voltage;

providing a tenth machine state, wherein the acquired battery voltage provides said processor with a value for replacing a maximum-voltage variable in said look-up table, the maximum-battery-voltage value being stored in memory;

providing an eleventh machine state, wherein a means of temporarily introducing a predetermined load into the circuit for providing said processor with a voltage value acquired from said battery for replacing a minimum-voltage variable in said look-up table, the resulting minimum-battery-voltage value being stored in memory;

providing a means of prompting said user to again manipulate said connector plug to its second position, thereby reconfiguring said circuit, as a twelfth machine state;

providing a thirteenth machine state, wherein said analog-to-digital converter polls said circuit for a voltage signal, the absence of said voltage signal confirming that said user has successfully manipulated said connector plug to its second position;

providing a fourteenth machine state, wherein said processor configures said power supply to output a low-voltage signal, thereupon enabling said analog-to-digital converter to acquire a current value along said circuit;

providing a fifteenth machine state, wherein said processor analyzes the acquired current value as representing a total cumulative load attributable to a combination of said resistive elements introduced in the previous fourth through sixth machine states, plus an additional load value attributable to an anticipated electrical load generated by the internal circuitry of the now- connected powered device, the presence of said additional load being an indicator confirming that said battery, while still mechanically attached along the reconfigured circuit, is electrically bypassed and, instead, said powered device is now electrically coupled to said apparatus, and

providing a sixteenth machine state being a determining-means for said processor to configure an initial output voltage of said power supply,

whereby, as a seventeenth machine state, said power supply delivers the previously determined initial output voltage to said powered device.

70. (withdrawn)

The acquiring of a current value along the circuit of the fourteenth machine state of claim 69, wherein said circuit includes a connector receptacle located in a battery pack that is wired directly to a battery cell cluster, thereby eliminating from the acquired current value any indeterminate load factor caused by pre-existing circuitry, and other resistive elements thereto, internal to said battery pack.

71. (withdrawn)

The computer-readable medium of the apparatus of claim 69, wherein said program instructions and related hardware of said apparatus are incorporated into a discrete modular apparatus for interconnecting in-line between an external power-conversion adapter and said battery of said powered device.

72. (withdrawn)

The computer-readable medium of the apparatus of claim 69, wherein said program instructions and related hardware of said apparatus are incorporated into an external power-conversion adapter for interconnecting a source of power to said battery of said powered device.

73. (withdrawn)

The apparatus of claim 69, wherein said apparatus is part of an embedded system having a power cord is incorporated into a retractor reel assembly that mounts in a location near a user workspace, so that a user can conveniently stow said power cord when not accessing said embedded apparatus, and a load value in a look-up table is adjusted to reflect a changed impedance value of the retractable power cord.

74. (withdrawn)

The connector plug assembly of claim 69, wherein said connector plug is not removable from said power cord, and said look-up table is adjusted to represent a new load value of these combined elements.

75. (withdrawn)

The acquiring of electrical load and voltage values of claim 69, further including a plurality of input/output ports accessible to said analog-to-digital converter, at least one of the ports for acquiring voltage values being reconfigurable by program instructions that direct a processor to manipulate a controllable switch that electrically couples at least one of one or more resistive elements to said port, whereby said port is reconfigured for acquiring current values.

76. (withdrawn)

The at least one resistive element of claim 75, wherein said resistive element exhibits an impedance value based on a charge rate of a discoverable chemistry-type of a battery, whereby program instructions configure said processor for analyzing identified battery chemistry types from a look-up table that lists battery charge rates as values for use by said processor in determining the impedance value required of said resistive element.

77. (withdrawn)

The method of employing electrical load values of claim 69, wherein said program instructions for configuring said processor for acquiring load values includes instructions that support both point-count and actual-values methodologies of determining said load values.

80. (currently amended):

The ~~memorized voltage values~~ system of claim 164, wherein said memorized voltage values further ~~including~~ include a look-up table for determining an anticipated fully-charged, or a nearly-discharged, battery prior to the execution of further program instructions for said processor configuring said power supply.

81. (currently amended):

The ~~interconnecting means~~ system of claim 164, wherein said interconnecting means further ~~including~~ include a means for controlling the direction of electrical flow [[is]] strapped across conductors of a connector receptacle for providing said power

supply simultaneous access to both said battery and said battery-powered[[-
]]device.

82. (currently amended):

The ~~connector assembly~~ system of claim 164, wherein said interconnecting means ~~further including~~ include a selectively user-positionable connector plug which, in a first position transfers electrical signals between [[the]] said configurable power supply and [[the]] said battery and, in a second position transfers electrical signals between [[the]] said configurable power supply and [[the]] said battery-powered device.

83. (currently amended):

The ~~selectively user-positionable connector plug~~ system of claim 82, further including program instructions for configuring an accessible processor to generate at least one of one or more visual ~~indicia to~~ indicia to a user, thereby prompting said user to manipulate said connector so that its contacts now transfer signals between said configurable power supply and said ~~batter~~ battery-powered device.

84. (currently amended):

The ~~attaching means~~ system of claim 122, further including [[in]] at both said configurable power supply and said battery-powered device a means of inter-device communications for transferring data signals.

85. (currently amended):

The ~~means of inter-device communications~~ system of claim 84, wherein said means of inter-device communications further ~~including~~ include additional program instructions for configuring processors at said configurable power supply and at said battery-powered device ~~respectively~~ respectively, to transfer data signals by at least one communications medium selected from the group consisting of powerline modulation, and wireless infrared, and serial/parallel data protocols.

86. (currently amended):

The ~~acquired battery voltage values~~ system of claim 122, wherein said acquired battery voltage values are retained in memory for use in further program instructions to configure said ~~processor~~ processing means for calculating a voltage that represents at least a first output value of said configurable power supply.

87. (withdrawn):

The first and second elements system of claim 155, wherein said power supply is embedded into aircraft fixtures as the first element, for delivering power to mobile battery-powered devices as second elements by users attaching said devices to an accessible connector port.

88. (currently amended):

The ~~configurable power supply~~ method of claim 125, wherein said configurable power supply is incorporated into a discrete modular apparatus for interconnecting in-line between an existing external power-conversion adapter and said battery-powered device and said battery installed therein.

89. (withdrawn):

The computer readable medium of claim 155, wherein said computer readable medium is embedded, and said program instructions are written to operate in an embedded environment.

90. (withdrawn):

The computer readable medium of claim 155, wherein said computer readable medium is incorporated into a battery pack, instead of a configurable power supply.

93. (currently amended):

The ~~means of configuring an output voltage signal~~ system of claim 164, wherein said configuring an output voltage signal further ~~including~~ includes:

said processing means including a general-purpose processor ~~capable of~~ accessing an analog-to-digital converter for acquiring voltage values of said battery;

said interconnecting means including a means of interconnecting said battery to an A/D converter, further including a receptacle at said battery for mating to a connector plug;

a memory to which the general-purpose processor writes:

> an acquired first value expressing a maximum output-voltage of said battery in a no-load condition;
>
> a second value being retrieved from said memorized voltage values as a look-up table comprising a substantial matrix of predetermined battery design parameters expressed as both maximum- and minimum-voltage reference values for a multiplicity of battery cells-per-pack configurations arranged by chemistry types;

said computer readable medium further embodying program instructions for configuring ~~said~~ the general-purpose processor for performing a comparing of the acquired first value to the retrieved second value as a maximum-voltage reference value, and

said analyzing means further including ~~said~~ the general-purpose processor ~~analyzes~~ analyzing the results of ~~said comparing~~ the comparing, by determining whether ~~said~~ the acquired first value is within a predetermined tolerance range of voltage variance when compared to the retrieved second value as the maximum-voltage reference value, whereby ~~said~~ the analyzing will result[[ing]] in either:

> accepting ~~said~~ the comparing as ~~confirming~~ confirmation that both voltage values are substantially the same, whereupon ~~said~~ the general-purpose processor writes both values to memory, or
>
> rejecting ~~said~~ the comparing because ~~said~~ the acquired first value falls outside ~~said~~ the predetermined tolerance range of voltage variance when compared to ~~said~~ the retrieved second value as the maximum-voltage reference value, whereupon ~~said~~ the general-purpose

processor discards the now-rejected maximum-voltage reference value and then retrieves from among [[the]] those previously ~~unselected~~ unretrieved maximum-voltage values in ~~said~~ the look-up table another reference value for repeating ~~said~~ the comparing and analyzing ~~functions~~;

~~said~~ the retrieving, comparing and analyzing ~~functions~~ repeat until ~~said~~ the analyzing results in an accepting of both the acquired first and retrieved second value as the maximum-voltage reference value[[s]], whereupon ~~said~~ the general-purpose processor writes both values to memory;

said acquiring further including a means of electrically engaging at least one of one or more resistive elements as a predetermined electrical pre-load temporarily applied to said battery for ~~said~~ the analog-to-digital converter acquiring from said battery a third value expressed as a minimum output-voltage, ~~said~~ the general-purpose processor then writing ~~said~~ the acquired third value to memory;

further program instructions for configuring ~~said~~ the general-purpose processor for retrieving from ~~said~~ the look-up table a fourth value expressing a predetermined minimum design voltage of a battery of the same cells-per-pack configuration and chemistry type as that of the previously accepted maximum-voltage reference value, ~~said~~ the general-purpose processor then writing the retrieved fourth value to memory as a minimum-voltage reference value;

additional program instructions for configuring ~~said~~ the general-purpose processor for performing a comparing of the acquired third value to the retrieved fourth value as the minimum-voltage reference value;

said analyzing means further including program instructions for configuring ~~said~~ the general-purpose processor for analyzing the results of ~~said~~ the comparing by determining whether ~~said~~ the acquired third value is within a predetermined tolerance range of voltage variance when compared to ~~said~~

the retrieved fourth value as the minimum-voltage reference value, thereby ~~said~~ the analyzing resulting in either:

accepting ~~said~~ the comparing as ~~confirming~~ confirmation that both values are substantially the same, whereupon ~~said~~ the general-purpose processor writes both values to memory, or

rejecting ~~said~~ the comparing because ~~said~~ the acquired third value falls outside ~~said~~ the predetermined tolerance range of voltage variance when compared to ~~said~~ the retrieved fourth value as the minimum-voltage reference value, whereupon ~~said~~ the general-purpose processor then retrieves from among [[the]] those previously ~~unselected~~ unretrieved minimum-voltage reference values in ~~said~~ the look-up table another reference value for repeating ~~said~~ the comparing and analyzing ~~functions~~;

~~said~~ the retrieving, comparing and analyzing ~~operations~~ repeat until ~~said~~ the analyzing results in an accepting of both the acquired third and retrieved fourth value as the maximum-voltage reference value[[s]], whereupon ~~said~~ the general-purpose processor writes both values to memory;

configuring ~~said~~ the general-purpose processor by further program instructions for executing a LIST function comprised of a compiling of the four previously accepted voltage values stored in memory, and

configuring ~~said~~ the general-purpose processor by additional program instructions for performing a SORT function upon the listed values by arranging the four previously accepted voltage values in ascending order,

resulting in not only a correctly determined battery chemistry type from among those in said look-up table, but also yielding sorted values listed in a specific sequential order consisting of:

first, the retrieved minimum-voltage reference value;

second, the acquired minimum battery voltage value;

third, the acquired maximum battery voltage value, and

fourth, the maximum-voltage reference value.

94. (currently amended):

The ~~look-up table~~ system of claim 93, wherein said look-up table further ~~including~~ includes a charge rate for each of said battery chemistry ~~type~~ types as a variable in further program instructions for [[a]] said general-purpose processor performing a calculation to determine an impedance value of said at least one of one or more resistive elements.

95. (currently amended):

The ~~performing of a SORT function upon the listed values~~ system of claim 93, wherein said performing of said SORT function upon the listed values further includes an acquired maximum-voltage value that varies significantly from said predetermined battery design parameter because said battery being fully charged causes it to output an excessively elevated maximum voltage, whereupon said acquired maximum-voltage value is adjusted by the predetermined tolerance range of voltage variance being calculated into said maximum-voltage value prior to said ~~sorting~~ performing of said SORT function.

96. (currently amended):

The ~~performing of a SORT function upon the listed values~~ system of claim 93, wherein said performing of said SORT function upon the listed values further includes an acquired minimum-voltage value that varies significantly from said predetermined battery design parameter because said battery being nearly discharged causes it to output an excessively low minimum voltage, whereupon said acquired minimum-voltage value is adjusted by the predetermined tolerance range of voltage variance being calculated into said minimum-voltage value prior to said ~~sorting~~ performing of said SORT function.

97. (currently amended):

The method ~~of determining a power requirement~~ of claim 167, further including a method of determining an anticipated ~~fully charged~~ fully-charged or ~~nearly discharged~~ nearly-discharged battery, comprising:

providing an apparatus for performing program instructions, comprising:

providing a processor capable of performing control functions;

providing a processor-controlled analog-to-digital converter interconnected to said battery via an interface comprised of at least one of one or more input/output ports accessible to a plurality of conductors and contacts of a connector assembly, said interface being so configured as to provide a means of controllably electrically coupling at least one of one or more resistive elements as a temporary electrical preloading of said battery for outputting to said analog-to-digital converter at least one minimum battery voltage, instead of a previous outputting of at least one maximum battery voltage;

providing a memory accessible to said processor for storing voltage values acquired by said analog-to-digital converter;

providing a computer-readable medium including a look-up table, also stored in said memory, comprising a substantial matrix of battery design parameters expressed as voltage values of a multiplicity of batteries arranged by both chemistry type and typical cells-per-pack configurations;

said computer-readable medium further including program instructions for configuring said processor to perform a first comparing of the acquired maximum voltage value to each maximum design voltage value from said look-up table, and

further including program instructions for configuring said processor to perform a second comparing of the acquired minimum voltage value to each minimum design voltage value from said look-up table,

whereby said first comparing results in said acquired maximum voltage value being excessively elevated as compared to said maximum design voltage values from said look-up table, thereby determining said anticipated fully-charged battery and, further,

whereby said second comparing results in said acquired minimum voltage value being excessively depressed when as compared to said minimum design voltage values from said look-up table, thereby determining said anticipated nearly-discharged battery.

98. (currently amended):

The method ~~of determining an anticipated fully charged battery or nearly discharged battery~~ of claim 97, wherein said determining an anticipated fully-charged battery or nearly-discharged battery further includes excessively elevated or excessively depressed voltage values which are compensated for by additional program instructions for configuring said processor [[for]] to adjust[[ing]] the excessive voltage values downward or upward respectively by a predetermined voltage tolerance amount, resulting in adjusted maximum- or minimum-voltage values that are available for other program instructions.

99. (currently amended):

The ~~preloading~~ method of claim 167, wherein said preloading said battery further including at least one of one or more said resistive elements [[is]] as a power resistor having an impedance value substantial enough to simulate an operational load of said powered device.

100. (currently amended):

The ~~temporary electrical preloading~~ method of claim 97, wherein said temporary electrical preloading of said battery further including [[the]] a resistive value of said at least one of one or more resistive elements [[is]] being determined by the charge rate of [[a]] said battery based on its chemistry-type, as expressed in a look-up table that lists voltage values of batteries by chemistry types and charge rates.

101. (currently amended):

The ~~determining of a nearly-depleted battery~~ method of claim 97, wherein said determining of said nearly-discharged battery further including an excessively depressed minimum voltage value ~~indicates~~ indicating a potentially unsafe battery.

102. (currently amended):

The ~~determining of a nearly-depleted battery~~ method of claim 101, wherein said determining of said nearly-discharged battery further includes a means of notifying a user of said potentially unsafe battery.

103. (currently amended):

The method ~~of determining the power requirement~~ of claim 167, wherein said determining said power requirement of said previously unknown battery-powered device further including a method of determining the chemistry-type of a battery, comprising:

providing said processor as a general-purpose processor ~~capable of~~ accessing an analog-to-digital converter for acquiring voltage values of said battery;

providing a means of interconnecting said battery to said A/D ~~converter~~ converter, including a receptacle at said battery for mating to a user-positionable connector plug;

providing a memory to which ~~said~~ the general-purpose processor writes:

an acquired first value expressing a maximum output-voltage of said battery in a no-load condition;

a second value being retrieved from said memorized voltage values as a look-up table comprising a substantial matrix of predetermined battery design parameters expressed as both maximum- and minimum-voltage reference values for a multiplicity of battery cells-per-pack configurations arranged by chemistry types;

providing a computer-readable medium embodying program instructions for configuring ~~said~~ the general-purpose processor for performing a comparing of the acquired first value to the retrieved second value as a maximum-voltage reference value, and

~~said~~ the general-purpose processor analyzes the results of ~~said~~ the comparing by determining whether ~~said~~ the acquired first value is within a predetermined tolerance range of voltage variance when compared to the retrieved second value as the maximum-voltage reference value, thereby ~~said~~ the analyzing will result[[ing]] in either:

> accepting ~~said~~ the comparing as ~~confirming~~ confirmation that both voltage values are substantially the same, whereupon ~~said~~ the general-purpose processor writes both values to memory, or
>
> rejecting ~~said~~ the comparing because ~~said~~ the acquired first value falls outside ~~said~~ the predetermined tolerance range of voltage variance when compared to ~~said~~ the retrieved second value as the maximum-voltage reference value, whereupon ~~said~~ the general-purpose processor discards the now-rejected maximum-voltage reference value and then retrieves from among [[the]] those previously ~~unselected~~ unretrieved maximum-voltage values in ~~said~~ the look-up table another reference value for repeating ~~said~~ the comparing and analyzing ~~functions~~;

~~said~~ the retrieving, comparing and analyzing ~~functions~~ repeat until ~~said~~ the analyzing results in an accepting of both the acquired first and retrieved second value as the maximum-voltage reference value[[s]], and ~~said~~ the general-purpose processor writes both values to memory;

providing a means of electrically engaging at least one of one or more resistive elements as a predetermined electrical pre-load temporarily applied to said battery for ~~said~~ the analog-to-digital converter acquiring from said battery a third value expressed as a minimum output-voltage, ~~said~~ the

general-purpose processor then writing ~~said~~ the acquired third value to memory;

providing further program instructions for configuring ~~said~~ the general-purpose processor for retrieving from ~~said~~ the look-up table a fourth value expressing a predetermined minimum design voltage of a battery of the same cells-per-pack configuration and chemistry type as that of the previously accepted maximum-voltage reference value, ~~said~~ the general-purpose processor then writing the retrieved fourth value to memory as a minimum-voltage reference value;

providing additional program instructions for configuring ~~said~~ the general-purpose processor for performing a comparing of the acquired third value to the retrieved fourth value as the minimum-voltage reference value;

providing further program instructions for configuring ~~said~~ the general-purpose processor for analyzing the results of ~~said~~ the comparing by determining whether ~~said~~ the acquired third value is within a predetermined tolerance range of voltage variance when compared to ~~said~~ the retrieved fourth value as the minimum-voltage reference value, thereby ~~said~~ the analyzing resulting in either:

> accepting ~~said~~ the comparing as ~~confirming~~ confirmation that both values are substantially the same, whereupon ~~said~~ the general-purpose processor writes both values to memory, or
>
> rejecting ~~said~~ the comparing because ~~said~~ the acquired third value falls outside ~~said~~ the predetermined tolerance range of voltage variance when compared to ~~said~~ the retrieved fourth value as the minimum-voltage reference value, whereupon ~~said~~ the general-purpose processor retrieves from among [[the]] those previously ~~unselected~~ unretrieved minimum-voltage reference values in ~~said~~ the look-up table another reference value for repeating ~~said~~ the comparing and analyzing ~~functions~~;

~~said~~ the retrieving, comparing and analyzing ~~operations~~ repeat until ~~said~~ the analyzing results in an accepting of both the acquired third and retrieved fourth value as the maximum-voltage reference value[[s]], and ~~said~~ the general-purpose processor writes both values to memory;

configuring ~~said~~ the general-purpose processor by further program instructions for executing a LIST function comprised of a compiling of the four previously accepted voltage values stored in memory, and

configuring ~~said~~ the general-purpose processor by additional program instructions for performing a SORT function upon the listed values by arranging the four previously accepted voltage values in ascending order,

whereby resulting in only a correctly determined battery chemistry type from among those in ~~said~~ the look-up table yielding sorted values listed in a specific sequential order consisting of:

first, the retrieved minimum-voltage reference value;

second, the acquired minimum battery voltage value;

third, the acquired maximum battery voltage value, and

fourth, the maximum-voltage reference value.

104. (currently amended):

The ~~receptacle for mating to a user-positionable connector plug~~ method of claim 103, wherein said user-positionable connector plug includes a ~~fist~~ first position for enabling access of said ~~apparatus~~ general-purpose processor to said battery, and a second position for enabling access of said ~~apparatus~~ general-purpose processor to a ~~powered~~ device powered by said battery.

105. (currently amended):

The ~~receptacle for mating to a user-positionable connector plug~~ method of claim 103, wherein said receptacle further ~~including~~ includes a means of controlling the direction of electrical flow strapped across ~~contacts of said receptacle~~ its

contacts, resulting in said general-purpose processor having access to both said battery and ~~said powered device~~ a device powered by said battery, whereby the need for said connector plug to be user-positionable is eliminated.

106. (currently amended):

The ~~matrix of predetermined battery design parameters~~ method of claim 103, wherein said predetermined design parameters substantially represent ~~industry standard~~ industry-standard values for charge rates, minimum and maximum voltages of individual battery cells, as well as typical battery pack configurations for at least one of one or more identifiable category of battery-powered devices.

107. (currently amended):

The ~~category of battery-powered devices~~ method of claim 106, wherein said category of battery-powered devices is ~~derived from~~ based on analyzing battery voltages and the typical number of cells normally required to power [[a]] at least one particular ~~group~~ class of substantially similar battery-powered devices.

108. (currently amended):

The ~~predetermined tolerance range of voltage variance~~ method of claim 103, wherein said predetermined tolerance range of voltage variance includes ~~allows~~ allowances for voltage variances caused by either fully-charged or nearly discharged batteries.

109. (currently amended):

A ~~means of~~ system for configuring an output of a configurable power supply, comprising:

interfacing means for electrically coupling said power supply to independently and simultaneously access both a previously unknown battery-powered device and an installed battery thereof, said coupling resulting in the power supply being capable of bypassing said battery as a source of power for the powered device, without limiting said battery's ability to automatically access said device;

preloading means for temporarily electrically coupling to the battery at least one of one or more substantial resistive loads, said resistive loads being capable of combining in order to vary the coupled load;

processing means accessible to said power supply for executing program instructions embodied on a computer-readable medium, comprising:

detecting means for acquiring at least one value as to voltage sag resulting from said preloading;

analyzing means for evaluating the acquired voltage-sag value and determining an anticipated fully-charged battery voltage;

said analyzing means further for producing an output voltage value of the configurable power supply by performing in a work space at least one of one or more predetermined computations based on acquired and memorized voltage values, and

controlling means accessible to said processing means and power supply for configuring the output voltage of the power supply to said previously produced output voltage value,

whereby, said power supply delivers a suitably configured power signal to said device.

110. (currently amended):

~~The predetermined computations~~ The system of claim 109, wherein [[the]] said analyzing means includes said predetermined computations based on memorized voltage values that are stored in a look-up table comprising at least one of one or more substantial matrices of battery design parameters.

111. (currently amended):

~~The configurable power supply~~ The system of claim 109, wherein said configurable power supply is a module so interposed as to be electrically coupled between a fixed-voltage power supply and [[the]] said battery, whereby the

interposed module reconfigures an inputted fixed voltage signal to be then output as a voltage signal of a value determined by said analyzing means.

112. (currently amended):

~~The detecting means~~ The system of claim 109, wherein said detecting means further includes a no-load maximum battery voltage value which is acquired prior to said acquiring [[a]] the value ~~representing~~ as to voltage sag, then a predetermined computation of both acquired values results in an optimized voltage value to which [[the]] said power supply is configured, thereby eliminating said predetermined computations ~~requiring the~~ based on said memorized voltage values.

113. (currently amended):

~~The preloading means~~ The system of claim 109, wherein said preloading means further ~~including~~ includes a switch accessible to said battery and said substantial resistive loads for varying [[the]] said coupled load applied to said battery by combining resistive loads.

114. (currently amended):

~~A means of~~ A system for configuring an output voltage signal of a configurable power supply for powering a battery-powered device, comprising:

> interconnecting means for electrically coupling said power supply to independently and simultaneously access both a previously unknown battery-powered device and an *in situ* battery thereof;
>
> preloading means for temporarily electrically coupling to the battery at least one of one or more substantial resistive loads, said resistive loads being capable of combining in order to vary said load;
>
> processing means accessible to said power supply for executing program instructions embodied on a computer-readable medium, comprising:

detecting means for acquiring and storing battery voltage values, at least one of which is a voltage-sag value resulting from said preloading;

analyzing means for producing an output voltage value of the configurable power supply by performing in a work space at least one of one or more predetermined computations based on acquired voltage values, and

controlling means accessible to said processing means and power supply for configuring the output voltage signal of the power supply to said previously produced output voltage value;

whereby a configured voltage signal is delivered to said battery-powered device from said power supply, instead of from said battery.

115. (currently amended):
The ~~interconnecting means~~ system of claim 114, wherein said interconnecting means further includes ~~coupling results in the~~ said power supply ~~capable of bypassing~~ being so electrically coupled as to bypass said battery as a source of power for [[the]] said powered device, without limiting said battery's ability to automatically access said powered device.

116. (currently amended):
The ~~interconnecting means~~ system of claim 114, wherein said interconnecting means further includes a connector interface interposed electrically at an existing connector located between said battery and said battery-powered device ~~provides~~ for providing said ~~power supply~~ powered device access to both [[the]] said battery and [[the]] said power supply.

117. (currently amended):
The ~~power supply~~ system of claim 114, wherein [[the]] said power supply is located within a battery enclosure, so that both [[the]] said battery and [[the]] said power supply are contained within the battery-powered device.

118. (currently amended):

The ~~power supply~~ system of claim 117, wherein said battery enclosure is removable.

119. (currently amended):

The ~~analyzing means~~ system of claim ~~114, wherein~~ 114, wherein said analyzing means further ~~including~~ includes predetermined computations based on both ~~acquired and memorized~~ memorized and said acquired voltage values, said memorized values stored in a look-up table representing at least one of one or more substantial matrices of battery design parameters.

120. (currently amended):

The ~~detecting and analyzing means~~ system of claim 114, wherein said detecting and anlayzing means further ~~including~~ includes acquiring an output voltage signal from the now-configured power supply, which is then compared to said previously produced output voltage value, for assuring that the voltage being output by the power supply is sufficient to ~~operate~~ power the now-operational device under the actual electrical load of the device.

121. (currently amended):

The ~~assuring~~ system of claim 120, wherein said assuring that said voltage being output by said power supply is sufficient further includes [[the]] said output voltage of [[the]] said now-configured power supply [[is]] being increased if [[the]] said actual electrical load of [[the]] said device causes [[the]] said output voltage to sag.

122. (currently amended):

A ~~means of~~ system for configuring an output voltage of a configurable power supply, comprising:

attaching means for electrically coupling said power supply to independently and simultaneously access a previously unknown battery-powered device and a battery electrically coupled thereto;

processing means accessible to said power supply for executing program instructions embodied on a computer-readable medium, comprising:

detecting means for acquiring battery voltage values, at least one of which is based on temporarily electrically coupling to said battery one or more available resistive elements, said elements capable of being combined for providing variable resistances;

analyzing means for determining an output voltage value for the configurable power supply by performing in a work space at least one of one or more predetermined computations based on [[the]] acquired voltage sag and fully-charged battery voltage values, and

controlling means accessible to said processing means and power supply for configuring the output voltage of the power supply to ~~said~~ a previously determined output voltage value.

123. (currently amended):

The ~~configurable power supply~~ system of claim 122, wherein said configurable power supply is an equivalently-configured discrete module that is electrically coupled between an upstream manually-configurable power supply and [[the]] ~~downstream~~ said battery and powered device downstream, so that an output voltage signal of the manually-configurable power supply is input at the module for ~~determining~~ confirming that the manually-configured voltage signal substantially matches said previously determined output voltage value, whereby, only if the voltages do substantially match does the output voltage signal of the manually-configurable power supply ~~pass through~~ flow out of the module and on to said powered device.

124. (currently amended):

The ~~acquiring means~~ system of claim 122, wherein said detecting means further ~~including~~ includes acquiring a no-load battery-voltage value which, should [[the]] said acquired voltage sag value not be valid, provides instead a value in an

alternate predetermined computation for determining an output voltage value for said configurable power supply.

125. (currently amended):

A method of configuring an output of a configurable power supply, comprising:

electrically coupling said power supply to access both a previously unknown battery-powered device and a battery installed therein;

processing program instructions embodied on a computer-readable medium accessible to said power supply, comprising:

acquiring a value expressing battery voltage sag by temporarily preloading said battery with at least one of one or more substantial resistive loads from accessible resistive elements that are variable by a combining thereof;

analyzing the acquired value for determining an anticipated fully-charged battery voltage;

performing at least one of one or more predetermined computations for producing an output voltage value based on memorized voltage sag and fully-charged battery voltage values, and

controlling the configurable power supply to output the voltage value resulting from the predetermined computation;

whereby said power supply accesses said powered device and delivers the resulting output voltage thereto.

126. (currently amended):

The ~~analyzing means~~ method of claim 125, wherein said controlling means further ~~including~~ includes an acquired output voltage signal of said configured power supply being ~~acquired and~~ compared to [[the]] said output voltage value resulting from said predetermined computation, then said output voltage signal being adjusted by said controlling means if the acquired ~~power supply~~ output

voltage signal is substantially lower than ~~the anticipated~~ said output voltage value, thereby reconfiguring the output in order to compensate for the actual resistive load of [[the]] a now-operational powered device exceeding [[the]] said resistive load applied when said temporarily preloading [[the]] said battery was performed.

127. (currently amended):

The ~~acquired value~~ method of claim 125, wherein said acquiring further includes a ~~first~~ no-load maximum battery voltage value [[is]] being acquired, ~~then a second~~ prior to said value ~~representing~~ expressing voltage sag caused by temporarily preloading said battery [[is]] being acquired, and a predetermined computation of both values ~~determines the~~ results in an output voltage value to which ~~the output of the~~ said power supply is configured.

128. (withdrawn): **[WITHDRAWN, per Item 2]**

A means of preloading a battery, comprising:

> interconnecting means for electrical coupling said battery, a battery-powered device, and a configurable power supply into a user-configured circuit for providing the battery independent and simultaneous access to both said device and said power supply, comprising:
>
> identifying means for distinguishing a specific interconnecting circuit element by its predetermined unique resistive value;
>
> processing means for executing program instructions embodied on a computer-readable medium, comprising:
>
> > means for providing a memorized sequence of anticipated user-manipulations of each circuit element based on its corresponding resistive value in a look-up table;
> >
> > instructing means for directing the user to manipulate at least one of one or more circuit elements according to said sequence,
> >
> > acquiring means for detecting resistive values;

determining means for assigning values to variables in the look-up table;

analyzing means for first adjusting in a work space said acquired resistive value by an allowable error factor, then for validating that the user manipulation is either valid or invalid by comparing the adjusted resistive value to values in the look-up table;

prompting means for indicating a valid or invalid manipulation to the user;

interposing means for preloading said battery by temporarily electrically coupling a substantial resistive element to said battery, and

said acquiring, determining, analyzing, and prompting means continuing until user-manipulations result in an electrical circuit into which said substantial resistive element for preloading said battery is temporarily interposed.

129. (withdrawn):

The interconnecting means of claim 128, wherein the power supply is electrically coupled in a closed circuit first to the battery for accessing battery voltage data, while the battery maintains its ability to access the powered device, as does the power supply also access the powered device along the same circuit by bypassing the battery.

130. (withdrawn):

The instructing means of claim 128, further including a placard with indicia for directing the user to manipulate at least one of one or more circuit elements according to said sequence.

131. (withdrawn):

The indicia of claim 130, further including visible indicators which are varied to prompt the user to manipulate said circuit elements.

132. (withdrawn):

The predetermined unique resistive value of claim 128, wherein said unique resistive value is established at the time of manufacture of each specific circuit element.

133. (withdrawn):

The acquiring means of claim 128, wherein an A/D converter accessible by a processor first attempts to acquire a voltage signal from along the power supply's output conductors and, if no line voltage is detected, the power supply generates a low-voltage signal along the output conductors which, upon acquiring an impedance value, causes any circuit element attached by the user to be detected by that element's unique resistive value.

134. (withdrawn):

A means of configuring an output of a manually-adjustable power supply based on an optimized voltage value previously acquired by preloading a battery, comprising:

> interconnecting means for electrically coupling the elements of a system comprised of the manually-adjustable power supply, the battery, and a previously unknown device powered by said battery, said interconnecting means providing said device with both said power supply and said battery as alternate sources of power so that when the power supply is not active, the battery is automatically available;
>
> processing means for executing program instructions embodied on a computer-readable medium, comprising:
>
> > indicating means for prompting the user to manipulate a selector which varies the output voltage;
> >
> > comparing means in a workspace for determining if an acquired voltage value associated with the present position of the user-manipulated selector substantially matches said optimized voltage value;

indicating means for notifying the user of a failed outcome of the previous manipulation, and prompting the user to perform a further selector manipulation;

said user manipulation, then said comparing and indicating means repeating, until a user-selected voltage value substantially matches the optimized voltage value, and

varying means for altering the indicating means to notify the user of a successful outcome from the most recent selector manipulation;

whereby the manually-adjustable power supply is configured by a successful user manipulation of a selector, resulting in said power supply outputting a voltage that substantially matches the optimized voltage value previously determined by preloading a battery.

135. (withdrawn):

The interconnecting means of claim 134, further including preloading said battery by temporarily electrically attaching at least one of a plurality of substantial resistive elements capable of being combined, the resulting voltage sag providing data for computing an optimized voltage value used to configure said power supply.

136. (withdrawn):

The interconnecting means of claim 134, further including a selectively user-positionable connector plug which, in a first position of insertion into a mating receptacle, transfers electrical signals between said power supply and said battery and, in a second position, transfers electrical_signals between said power supply and said device.

137. (withdrawn):

The analyzing means of claim 134, wherein the comparing is performed by a voltage comparator circuit.

138. (withdrawn):

The interconnecting means of claim 134, further including an intermediate module electrically interposed between said manually-adjustable power supply and said battery, so that said comparing and indicating means based on selector manipulations is performed at said module.

139. (withdrawn):

The selector of claim 134, further including an indicia displaying a numerical representation of a multiplicity of available output voltages said power supply is capable of delivering.

140. (withdrawn):

The comparing means claim 134, wherein, based on a user-manipulation not resulting in a voltage match, an additional predetermined computation is performed for determining a value that represents a voltage difference between the user-selected value and the optimized voltage value, and whether the selected value is above or below the optimized voltage.

141. (withdrawn):

The additional calculations of claim 140, wherein the outcome of said determining results in varying the indicia in either:

a first mode for prompting the user to manipulate the selector in one direction, or

a second mode for prompting the user to manipulate the selector in an opposite direction, and

said varying the indicia after each user manipulation continuing, based on the outcome of each additional computation, until a final user manipulation substantially matches the selector value to the optimized voltage value.

142. (withdrawn):

The selector of claim 134, wherein the selector is a screen with an area for displaying voltage values input from a user input means.

143. (withdrawn):

The indicating means for prompting a user to manipulate a selector of claim 134, further including a means of configuring the power supply if the user fails to perform any manipulation, wherein a processor accessible to the power supply performs a predetermined computation of the acquired data resulting in an optimized voltage value, and a controller configures the output of the power supply to the optimized voltage value.

144. (withdrawn):

A means of configuring an output of a manually-configurable power supply based on data acquired by a previous accessing of a battery, comprising:

interconnecting means for electrically coupling elements into a system comprising the configurable power supply, the battery, and a previously-unknown device powered by said battery, said coupling resulting in the power supply being capable of bypassing said battery as a source of power for the powered device, without limiting said battery's ability to automatically access said device;

communicating means of at least a first and a second of said elements for transferring said acquired data, including at least one voltage value;

processing means at said first and second elements for executing program instructions embodied on a computer-readable medium, comprising:

> analyzing means in a workspace for comparing the acquired data with a value acquired from a selector that varies voltage, said selector located at only one user-accessible element of the system;
>
> prompting means at only one user-accessible element of the system for directing a manipulation of the selector, said prompting further including a means of distinguishably indicating when the user has successfully manipulated the selector to a setting that represents a substantial match of the selected voltage value to the acquired data, and
>
> controlling means for configuring the output of said power supply according to said substantially matched voltage values;

whereby said previous accessing of said battery provides data that is communicated between interconnected devices for manually-configuring the output of said power supply and, further,

whereby a user selects an output voltage for the power supply that is within an optimized range of battery output voltages.

145. (withdrawn):
The first and second elements of claim 144, wherein one of said elements is a module electrically coupled between the manually-configurable power supply and the battery.

146. (withdrawn):
The communicating means of claim 144, further including a modulator/demodulator accessible to the processors of the first and second elements, and data transfer is performed by powerline modulation along interconnecting conductors that electrically couple said first and second elements of the system.

147. (withdrawn):
The communicating means of claim 144, wherein recognized inter-device data protocols provide transfers along conductors electrically coupling said first and second elements of the system.

148. (withdrawn):
The communicating means of claim 144, wherein the communicating means provides wireless data transfer between said first and second elements of the system.

149. (withdrawn):
The communicating means of claim 144, wherein said first element is electrically attached to the second element by a connector interface at a data I/O port of one of the elements.

150. (withdrawn):

The communicating means of claim 149, wherein only said first element is processor-enabled, and said second element incorporates the selector, so that a selected value transfers to the processor for performing said analyzing means.

151. (withdrawn):

The communicating means of claim 144, wherein the data transferred is acquired from a "smart" battery.

152. (withdrawn):

The communicating means of claim 144, wherein the processor at the first element in the system performs at least one predetermined computation resulting in an optimized voltage value which then transfers as data to the second element, said optimized voltage value being then substantially matched by said user-selected voltage value.

153. (withdrawn):

The acquired data of claim 144, wherein a no-load maximum voltage value is acquired and a computation determines an optimized voltage value to which the user-selected voltage value is then matched prior to said power supply being configured.

154. (withdrawn):

The prompting means of claim 144, wherein a visual indicator stays in a first mode, until the user selects a setting that substantially matches the acquired voltage, whereupon the visual indicator changes to a distinguishably different second mode.

155. (withdrawn):

A means of configuring an output of a configurable power supply based on data acquired by previously accessing a battery, comprising:

interconnecting means for electrically coupling elements of a system comprising an interface at an unknown battery-powered device for attaching both said

battery and said power supply, so that either is available for delivering power to the device, and at least a first and a second element of said system further comprising;

communicating means for transferring said acquired data between said first and second elements;

processing means for executing program instructions embodied on a computer-readable medium;

analyzing means in a work space for determining, based on said acquired data, an optimized voltage value representing at least a first output signal of the power supply, and

controlling means accessible to said processing means and power supply for configuring the output signal of the power supply;

whereby previously acquired battery data is communicated between interconnected elements for configuring an output of a configurable power supply.

156. (withdrawn):
The first and second elements of claim 155, wherein one of said elements is a module electrically coupled between a fixed-output power supply and the battery.

157. (withdrawn):
The communicating means of claim 155, wherein the communicating means provides wireless data transfer between said first and second elements of the system.

158. (withdrawn):
The communicating means of claim 155, further including a modulator/demodulator accessible to the processors of the first and second elements, and data transfer is performed by powerline modulation along interconnecting conductors that electrically couple said first and second elements of the system.

159. (withdrawn):

The communicating means of claim 155, wherein said first element is electrically attached to the second element by a connector interface at a data I/O port of one of the elements.

160. (withdrawn):

The communicating means of claim 155, wherein the data transferred is acquired from a "smart" battery.

161. (withdrawn):

The communicating means of claim 155, wherein the processor at the second element in the system receives data representing an unprocessed voltage value, with which said processor performs at least one predetermined computation resulting in an optimized voltage value, said optimized voltage value being then used by the controlling means for configuring the output of the power supply.

162. (withdrawn):

The first and second elements of claim 155, wherein the first elements is embedded into fixtures in an environment and the second element is a user-operated battery-powered device capable of transferring data with said first element.

163. (withdrawn):

The first element of claim 162, further including connectivity of a multiplicity of said elements as nodes in a network.

164. (currently amended):

A ~~means of~~ system for configuring an output voltage signal of a configurable power supply for powering a previously unknown battery-powered device, comprising:

interconnecting means at said battery-powered device for electrically coupling a battery and said configurable power supply, so that the power supply accesses first said battery and then said battery-powered device;

preloading means for temporarily electrically attaching a first resistive element at said battery;

varying means for further preloading said battery by combining said first resistive element with at least one other available resistive element;

processing means accessible to said power supply for executing program instructions embodied on a computer-readable medium;

acquiring means for capturing a voltage sag value when preloading, then again when varying said preloading;

analyzing means performed in a work space for determining an anticipated fully-charged battery voltage based on at least one of the acquired voltage values, then further analyzing by performing at least one of one or more predetermined computations based on acquired and memorized voltage values, resulting in a value for configuring a first output voltage of said configurable power supply, and

delivering the output voltage signal to the battery-powered device from said configurable power supply, instead of from said battery.

165. (currently amended):

The ~~configurable power supply~~ system of claim 164, wherein [[the]] said configuring said first output voltage of said power supply is by means of a manually-adjustable selector manipulated by a user.

166. (currently amended):

The ~~configurable power supply~~ the system of claim 164, wherein [[the]] said configuring said first output voltage of said power supply is ~~automatically configuring~~ automatic, and the power supply is interconnected as a module electrically coupled between a fixed-output power supply and [[the]] said battery.

167. (previously presented):

A method of determining a power requirement of a previously unknown battery-powered device, comprising:

interconnecting said powered device for receiving power by electrically coupling an installed battery and a configurable power supply thereto, so that the power supply accesses first said battery and then said device;

preloading said battery by temporarily electrically attaching a first resistive element thereto;

further preloading said battery by combining said first resistive element with at least one other available resistive element;

providing a processor accessible to said power supply for executing program instructions embodied on a computer-readable medium;

> acquiring voltage sag values upon said preloading, then again when varying said preloading;
>
> analyzing, in a work space, an anticipated fully-charged battery voltage based on at least one of the acquired voltage ~~values, and~~ values, and
>
> further analyzing by performing at least one of one or more predetermined computations based on acquired and memorized voltage values, resulting in determining a voltage value as the power requirement of the powered device;

whereby said determined value is for configuring a first output voltage signal of said power supply.

168. (currently amended):

The ~~configurable power supply~~ method of claim 167, wherein [[the]] said configurable power supply [[is]] configures automatically ~~configuring, and~~ by a controller means at said processor, and said configurable power supply is ~~interconnected as a~~ enclosed in an in-line module ~~electrically coupled~~ that is interconnected between a manually-adjustable power supply and [[the]] said battery installed within said battery-powered device, so as to be electrically coupled for accessing both said battery and said battery-powered device.

169. (currently amended):

The ~~analyzing means~~ method of claim 167, wherein said analyzing further includes said at least one of said acquired voltage values being a no-load maximum voltage value ~~is acquired, and the result of the~~ for performing a predetermined computation[[s]] [[is]] thereon which results in a voltage value ~~for configuring~~ as both the power requirement of said powered device and the voltage value to which an output of said power supply will be configured.

RESPONSE RE: CLAIMS

Item #1: Applicant acknowledges that claims 1-20, 52, 78, 79, and 92 are cancelled in this action.

Applicant further acknowledges that claims 21-51, and 53-77 are withdrawn in this action. Pursuant to the Revised Amendment Practice under 37 CFR 1.121, the entire text of these withdrawn claims is presented here in clean version.

Also, further claims 87, 89, 90, and 128-163 are now withdrawn, based on the Election/Restriction in Item #2 of the instant Office Action. The entire text of these withdrawn claims is also presented here in clean version.

Claims 80-90 and 93-108, as well as previously presented new claims 109-169, are herein presented for consideration in this action, and are readable on the elected claimed invention of Group III as drawn to determining the power requirements of a powered device adapted to receive power selectably from a battery and a configurable power supply, comprising preloading said battery with a resistive load, classified in class 700, subclass 297.

The listing of claims set forth above identifies the disposition of the various claims in the Office Action. Applicant requests that these claims as herein presented be entered into the application as the claims of record.

The claims remaining herein for consideration contain 6 (six) independent claims, and 43 (forty-three) dependent claims.

The claims herein submitted contain no new matter, and fall completely within the scope of the material set out in the originally filed documents.

RESPONSE RE: ELECTION/RESTRICTIONS